The MAC Flyer
MAC WINS
SECRETARY OF THE AIR FORCE
SAFETY AWARD FOR 1979
See Page ...3

The MAC Flyer

MILITARY AIRLIFT COMMAND

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For Greater Safety and Efficiency in MAC Air Operations.

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Flyer Call

Each year, the MAJCOM with the best overall safety program is selected for the Secretary of the Air Force Safety Award. In the forest of safety awards, the Secretary's Trophy is the Sequoia—the highest recognition in the Air Force awards hierarchy. Once again, and for the second time in the past three years, MAC has walked off with the honors. Although the trophy does salute the entire spectrum of the command's safety-mindedness, one of the major considerations is aircraft-related accident statistics. Considering that MAC flew almost one-fourth of the total time logged by the entire Air Force during 1979, you can see why flying safety is such a sizeable factor. You flyers who dramatically reduced last year's accident rates over 1978's can therefore take an extra measure of pride in your contribution to the overall safety effort by the command.

Safety folks, including those of us at *TMF* who chronicle the good and bad for you each month in the hope of helping people learn from the mistakes and achievements of others, like to take a modicum of credit when one of these "biggie" awards comes along. But when you get right down to basics, no safety person, regardless of his or her brilliance, cleverness or ability to articulate safety principles, can get to first base unless people at all levels of the command listen and give their wholehearted cooperation and support to doing things safely. There's no doubt about it, you in MAC have made safety awareness a way of life, and each of us should take justifiable pride in the Secretary of the Air Force's recognition of that fact.

JGG

MAC IS TOPS IN SAFETY FOR 1979

DEPARTMENT OF THE AIR FORCE
WASHINGTON, D.C. 20330

OFFICE OF THE SECRETARY

FEB 2 2 1980

General Robert E. Huyser
Commander-in-Chief, Military Airlift Command
Scott Air Force Base, Illinois 62225

Dear ~~General Huyser~~ Bob:

I am pleased to inform you that the Military Airlift Command has been selected as the winner of the Secretary of the Air Force Safety Award for 1979.

The safety achievements of the Military Airlift Command are highly commendable. The command's Class A aircraft mishap rate equaled the lowest achieved in the past seven years and aircraft-related fatalities were the second lowest ever experienced in the history of the command. These accomplishments are particularly noteworthy in recognition of the diverse mission and global responsibilities of the Military Airlift Command. The 500 lives saved by the crews of the Air Rescue and Recovery Service and the airlift support for natural disasters throughout the world are exceptional humanitarian accomplishments that reflect favorably on the national and international image of our Air Force. Equally impressive accomplishments in the weapons, ground and nuclear safety programs attest to the professionalism and motivation evident throughout the command.

I extend my personal congratulations to you and each member of the Military Airlift Command.

Sincerely,

Hans

Hans Mark

To the Men and Women of Military Airlift Command:

AREN'T WE PROUD? WE SHOULD BE--

One of my primary concerns as we go about accomplishing our mission is that we do our jobs as safely as possible. Careful use and conservation of the national defense resources entrusted to us are key elements in our ability to meet the challenges we face. This award lets the world know that we in MAC are motivated and dedicated to serving as America's "Backbone of Deterrence." I proudly add my warmest congratulations to those of Secretary Mark.

Robert E Huyser

ROBERT E. HUYSER
General, USAF
Commander in Chief

Enough experience is wrapped up in "the books" to make any mission easy.

Cherry Ride Blues

by Doug Wolff
Miami, Florida

Uh-oh. File a notam. Duck's got his cherry ride Wednesday."

An ops clerk with a cute sense of humor had colored in two red cherries on a stem next to "Duck" Swanson's name on the big grease board. Rodeo Joe, Dirty Ernie and Big Red smiled; Duck, tight-lipped, squinted at the scheduling board as if it were two blocks down the street.

"Yeah, I remember my first ride as aircraft commander." Big Red leaned back on the counter, gazing fondly into space. "Got a prop-low-oil light climbing out of Navy Glenview. Boy, was I a clown? Lucky I had an old-head engineer to keep me out of trouble. I couldn't even talk for three or four minutes." Joe and Ernie laughed; Duck's eyes still hadn't reentered the atmosphere.

Lemmesee, Duck thought silently, prop-low-oil light. Go mechanical, condition lever feather—no, no, pitchlock check, then—wait a minute, that's not right. Oh, Lord, I'm gonna *die*!

"At least you had a bold-face emergency we practice a lot," Rodeo Joe interjected. "On my premier, I had a dad-gum AC bus failure. I was real cool. I said, 'Engineer, take care of that.' Unfortunately, my engineer was a recent upgrade who knew even less about the electrical system than I did."

Oh God, Duck prayed, not an electrical problem. *Anything* but an electrical problem.

"Heck, I got you guys beat easy." It was Dirty Ernie's turn. "I got diverted to Roanoke to pick up some Marines and approach cleared me for an LDA.* Snow, haze, at night, high terrain everywhere, and I'd never even *heard* of an LDA."

LDA? LDA! Are they joking? Is there really such an animal? Duck was nearly comatose now, sweat forming on his furrowed forehead. A crowd of chuckling pilots had gathered around the ops center, each anxious to tell his favorite cherry ride war story. "Wait, wait, lemme tell you about my APU fire!" "Aw, that's small potatoes; I had asymmetric flaps!" Duck oozed down the counter and slipped out of the office.

"Why did I ever get into flying anyway?" Duck was now talking aloud to himself as he drove home. "Where's the fun, the glory, the excitement? I'm too young for all this worrying. They should have given me more experience before sending me out as aircraft commander."

A high-speed video recording of his copilot days ran by the Duck's glazed eyes as he melted into his La-Z-Boy, a mug of gin-and-tonics balanced on his chest. The carefree days. No responsibility. Raise the gear and see the sights. Don't forget the jugs, the mission kit and the secrets. Boring, but safe, Duck remembered.

Sure, I wanted to upgrade. And yes, I went through formal upgrade training at the Rock. But what can they teach you in a few rides? Everybody says the pubs are a waste of time compared to experience, right? Face it, kid, you ain't ready. Experience is the key. "Got to have more experience!" he demanded to himself.

Honorable Mention, 1979 MAC Flying Safety Writing Contest

Maybe I can volunteer for a rated sup. ROTC's hurting for instructors. I could handle a nice quiet college campus. Flying's nothing but work and worry. Maybe I'll go DNIF tomorrow . . . .

The Duck slept, sort of. His mind's eye was skidding through miles and miles of hydraulic plumbing, wondering where the line would break. It crossed over into the electrical wiring, millions of yards of potential shorts, overloads and fires. It dove into the throttle quadrant, noting weaknesses in cables and connectors. It twisted through the props, turbines and nacelles where various leaks and lesions would certainly cause failures.

Duck dreamed of weather charts loaded with thunderstorms, turbulence, ice, hail and fog. He saw approach plates saturated with high hills, numerous towers, complex point-to-point entries, arcing, multiple navaid cross-tuning requirements, and altitude restrictions. He heard approach instructions transmitted in Chinese—or maybe Latin.

Vaguely familiar phrases and abbreviations pummeled the Duck's head like rubber pellets: command and control, hijack, NESA, AIREP, special weapons, ATM, SIGMET, nordo, caution, note, warning. Warning!

The Duck awoke, his favorite Notre Dame T-shirt pitted out to the hem. Moving only his eyes, as if scanning for traffic, he sighted a heavy black case. Lifting it into his lap, he removed two large black binders. Well, any port in a storm, Duck philosophized. Lemme-see, here, prop-low-oil light . . . .

"Hey, guys, here's the rookie!" The ops center kibitzers turned their eyes as the Duck strode in.

"Hi, boys, anybody want a lift to Gitmo? Duck seemed about two inches taller, in spite of the heavy black case in his left hand.

"Guantanamo? They're gonna trust you on a Guantanamo run on your cherry ride? Listen, Duck, there's a lot of special procedures and stuff on that trip." Big Red was the lecturer. Ernie and Joe nodded knowingly.

"Yeah, I know. I read all about it. No biggie, Red. Wow, what a beautiful day. You guys notice how beautiful it is today? What a day to fly!"

"Duck, we're sitting under a thunderstorm. What've you been smoking, Ace?" Dirty Ernie gave Duck's breath a quick check.

"Sure, there's a little weather. No problem. See, as long as I can avoid the rain shaft, and depart so as to increase my distance from the storm, and—"

Rodeo Joe cut him off. "Yeah, okay Duck. Jeez, they sure gave you a shaky crew. Isn't that the engineer who thought the main DC bus was a Greyhound to Washington!"

"I guess he's had some problems, but we'll do okay. Once you know that the main DC bus is connected to the essential DC bus through a reverse current relay, which is activated by a touchdown switch . . . ."

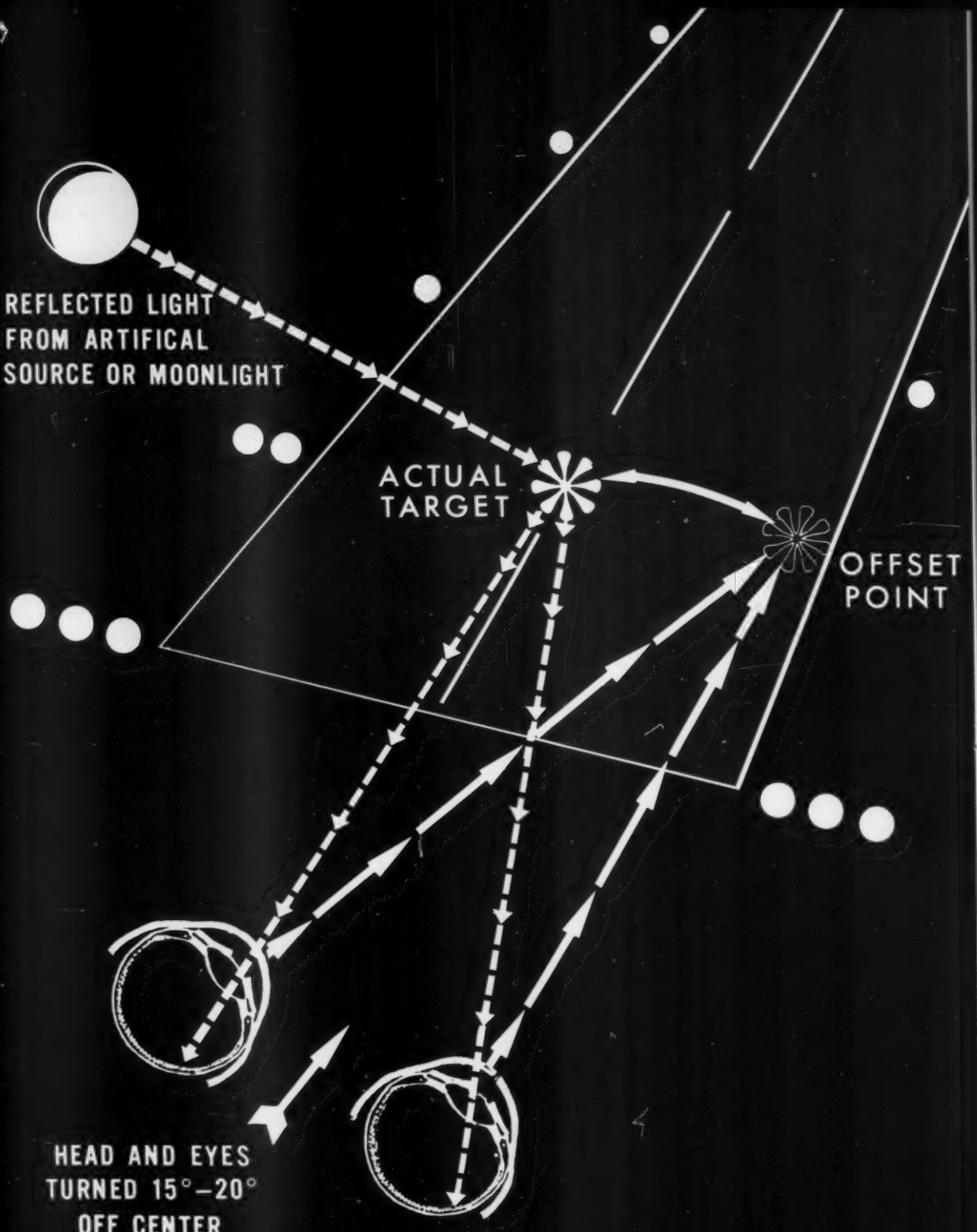
Rodeo Joe, Dirty Ernie and Big Red watched as Duck strolled confidently out of the squadron and climbed aboard the crew bus. Red shook his head as he spoke.

"But the thing I don't understand is, where did he get all that *experience*?"

*For those of you who haven't run across an LDA approach, it's a localizer-type directional aid that's used for non-precision approaches. Its accuracy is comparable to a localizer, but it's not a complete ILS and isn't aligned with the runway. —Ed.

ABOUT THE AUTHOR

Doug Wolff is a native of Palatine, Illinois. He holds a bachelor's degree in public relations from Drake University and a master's degree from Abilene Christian University. Mr. Wolff received his Air Force commission through ROTC in 1973, and completed pilot training at Webb AFB. After UPT he was assigned to Dyess AFB, Texas, as a C-130 pilot. On his very first mission as an aircraft commander, Doug experienced a prop malfunction which he obviously survived to tell about. He separated from the Air Force in December 1979 and is currently employed as a Boeing-727 Second Officer by Delta Airlines.


REFLECTED LIGHT
FROM ARTIFICAL
SOURCE OR MOONLIGHT
ACTUAL
TARGET
OFFSET
POINT
HEAD AND EYES
TURNED 15°–20°
OFF CENTER

In the dark, where you look can make a big difference in what you see.

NIGHT VISION

by CW2 Robert L. Portman
US Army Aviation Center
Fort Rucker, Alabama

Your eyes work well for you during the day, so won't they do the same at night? No! They will work well at night only if you use them properly.

The best way to understand night vision is to imagine that you are using a completely different visual system—which, in fact, you are. During the day you use central vision. Looking straight at an object, the reflected light strikes the center of the retina, the fovea, where the daytime visual receptors, the cones, are concentrated.

In a dark night environment your cone cells don't recieve enough light to permit them to function properly. But your night visual receptors, the rods, can only start functioning when the light level is low. Initially the rod cells are 100 times as sensitive to light as the cones, but increase to 100,000 times that sensitivity in the fully dark-adapted state. It may seem that human eyes are pretty well designed for adaptation to a night environment, but a cat has rod cells six times more sensitive than ours. The rods are mostly concentrated in a ring around the fovea about 10 to 20 degrees off center. To see anything at night, you must look off-center or to the side of the viewed object at least two degrees outside the fovea. Beyond two degrees the cone density decreases and the rod density starts increasing. To see at your best, you must look off center at about 15 to 20 degrees to be in the area of maximum rod density for both eyes—a fact well worth remembering.

Fovea size is not the same for all people. In fact, opthalmologists found that the night central blind spot (area of total cones) varies in both size and shape among different people. To determine the shape and size of your own fovea, go outside on a clear night and look up at the sky. Select an area of dim stars. Stare at one star using central day vision and it will disappear. Then stare at the next closest star, then the next, working away from the original star until it reappears. Try working both sides, above, and below to determine your own night central blind spot. This short exercise should give you a better understanding of off-center night vision.

With good off-center vision, faint distant objects like the dim lights on a tactical landing zone or another aircraft will be easily seen. Even though we are not true night creatures, if we understand our night vision we can fly with increased confidence and safety.

—U.S. Army *Aviation Digest*

Accident Statistics for 1979

During 1979, Military Airlift Command flew 727,595 hours and had only six DOD Class A mishaps for a rate of 0.8 per 100,000 flying hours. The accompanying charts show that MAC's Class-A rate is well below the USAF rate for 1979, and below most of the other MAJCOMs. Contrasting 1979 with 1978, when MAC's Class A flight mishap rate was 1.37, we chalked up a 42 percent improvement. The Command's missions during 1979 were neither easier nor less risky than during 1978, and our aircraft were a year older, so credit for this admirable improvement goes to the crewmembers and the people who support flying operations.

Since 1979 marked the end of a decade, it's worth noting that 0.8 matches the 1977 and 1976 major accident rates. Also, only 1972's rate of 0.53 was lower during the seventies. As we move into the eighties, MAC's people have re-established the command's reputation as a leader in flying safety.

Class A Mishaps

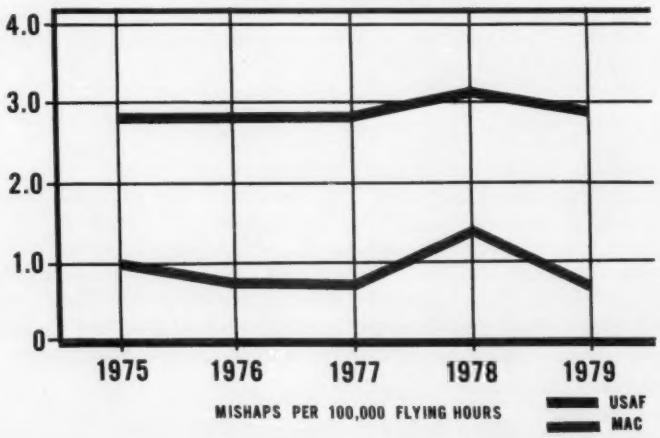
Both fixed-wing and rotary-wing aircraft were involved in MAC's major mishaps during 1979. Our Class A mishaps cost us three crewmembers' lives, three aircraft and over $14,400,000. By comparison, 1978's losses included 29 fatalities, six aircraft destroyed, and a cost of over $20,000,000. MAC's tactical airlift force flew through 1979 without a single Class A mishap after accounting for over half of 1978's most severe mishaps. Human factors were involved in over 60 percent of 1979's accidents, reaffirming the concept that people are both the problem and solution in accident prevention.

Mishap Briefs

C-9. The airevac flight progressed normally through arrival sequencing and handoff to precision radar. At decision height, the copilot called the runway in sight, and the left-seater transitioned from PAR to visual references. Seconds later, the AC lost sight of the runway due to fog and initiated a go-around. The Nightingale contacted the snow-covered overrun short of the threshold. Ice and snow kicked up by the main gear damaged the left engine and it

USAF & MAC

CLASS A MISHAP RATES

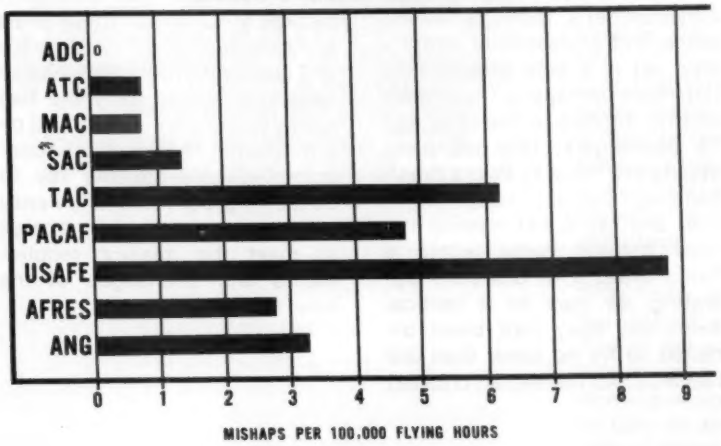


quit. When the pilot brought the throttles into reverse, the C-9 veered toward the right edge of the runway and hit two runway lights. The aircraft was then maneuvered back on the runway and stopped. There were no injuries.

HH-53. During an over-water air-refueling mission with an HC-130, the Super Jolly Green's main rotor blades hit the air-refueling drogue. Damage to the rotor system induced a severe lateral shuffle. The crew attempted to keep the aircraft airborne long enough to land on an island, however, the oscillations caused the tail boom to separate from the fuselage. The helicopter crashed inverted into the ocean. Three crewmembers were killed and a fourth escaped with minor injuries.

C-141. After coaching three students through more than a dozen instrument approaches and landings on a night-local mission, the IP flew the final approach and landing. What seemed to be only a minor hydraulic system malfunction reduced the dependability of *normal* brakes to questionable status, but the emergency system appeared okay. The C-141 was properly configured for landing and after touchdown the copilot deployed the spoilers, which opened part way and then closed. The pilot moved all four throttles to reverse idle, but only number four responded to the command. Directional control was maintained using the flight controls and the IP tried the brakes. Discovering normal brakes inoperative, he selected emergency binders. They didn't appear to slow the Starlifter either, so he re-selected normal brakes. About this time the landing-gear warning horn sounded and the nose gear indicator showed unsafe. As the nose gear retracted due to a system malfunction the 141 settled onto its nose and stopped about 800 feet from the end of the runway. The crew egressed safely, but an intense hydraulic-fluid-fed fire quickly rendered the airframe unsalvageable.

DOD
CLASS A MISHAP RATES FOR 1979



C-141. After an early-morning show time, the crew departed on schedule for a local training sortie. They did several instrument approaches and six touch-and-go landings. During the rollout on a touch and go, but before starting the takeoff portion, the pilot in the right seat inadvertently raised the gear handle. Although the handle was immediately returned to the down position, the main gear retracted. The Starlifter slid to a stop and the crew shut down the engines and egressed uninjured.

C-141. On an evening local training mission, the Starlifter crew flew two touch and goes followed by a full-stop landing for taxi back. The pilots swapped seats and one crewmember deplaned. After takeoff, the 141 was vectored for a PAR approach to be flown by the trainee. The instructor was temporarily distracted by cockpit communication difficulties, and none of the crewmembers realized that the gear was not down until the aircraft was in the landing flare. A go-around was started immediately, but the bottom of the fuselege scraped the runway. Emergency procedures were completed and the Starlifter landed safely with the gear pinned down.

H-3. The Rescue crew was diverted from a training mission to conduct an emergency search for a downed civil aircraft. They located the crashed light plane, landed and found four survivors, two of them with severe back injuries. Due to low fuel state and lack of medical help, they left the site and flew to a nearby civilian airport. There they refueled the Jolly Green and took aboard emergency medical personnel. Departing the civil field after sundown, the H-3 crew

picked their way around snow showers and rough terrain back to the crash scene. After the doctors readied the survivors for evacuation, they and the victims were all loaded aboard the helicopter. The pilot flew an instrument takeoff with the co-pilot monitoring outside references. Even though the anti-ice system was activated during the ascent, an anti-ice valve for the number-one engine failed to open, preventing proper operation of the system. The engine ingested ice and lost power. The helicopter began a descent that ended in a crash landing less than 30 seconds after liftoff. The crew and passengers were injured and the H-3 was damaged beyond economical repair.

Class B Mishaps

MAC had eight Class B mishaps during 1979 for a year-end rate of 1.1 per 100,000 flying hours. This compares favorably with the USAF rate of 2.0. Nearly every type of fixed-wing aircraft in MAC's inventory was involved in a Class B mishap last year, but no real trends were established. A C-130 nose gear strut failed while the aircraft was taxiing, causing $143,361 damage. Encounters with birds and animals in the airport environment cost $148,279 for two mishaps. Failures in engine systems that did damage to other parts of the aircraft cost $217,486 during '79 for one C-141 and one C-5 mishap. Two landing gear malfunctions on Starlifters resulted in over $200,000 damage. "Minor accidents" can be an indicator of major problems, however, and their severity is sometimes limited only by an aircrew's skill or fortuitous circumstances. Two 1979 Class B mishaps illustrate this point.

A C-141 suffered a gear malfunction on takeoff from McMurdo Station, Antarctica, that made it impossible to retract the right-main gear. After consultation with MAC and Lockheed experts, the crew reconfigured the airplane for a high-altitude cruise that allowed them to reach New Zealand. The crewmember's technical knowledge and professional airmanship led to a safe landing with minimum damage to the aircraft and no injuries to the crew and 12 passengers. (For complete details see "How to Plan a Crash Landing," Feb 80, *TMF*.)

Results of a C-141 gear-up landing.

In another C-141 mishap the crew literally came within a hair's breadth of disaster. Operating as part of a tactical exercise, they had been directed to fly no lower than 300 feet AGL. As the aircraft crossed an area of mountainous terrain, however, the left wing contacted the ground. About four feet of the tip was torn away resulting in a ruptured main fuel tank and damaged aileron. The massive fuel loss led to a flame out of number-one engine, but the crew recovered the aircraft to a nearby air base. There were no injuries.

Challenge of 1980

Odds-makers at the Air Force Inspection and Safety Center predicted MAC would have seven Class A and ten Class B mishaps and destroy five aircraft in the process during 1979. We undercut those predictions in every category! MAC men and women who fly and maintain our aircraft, and support flight operations around the world proved that dedication to doing the joo safely does reduce the mishap rate—this is especially evident in the tactical airlifter's accident-free year.

The challenge of the eighties is before us. We must diligently keep pursuing that elusive zero mishap rate—we cannot afford to do otherwise. For the next decade MAC will continue to be a strong tool of national policy and our nation will continue to depend on us to carry the flag safely to any part of the world on a moment's notice. Safety conscious people are the key to conserving our national defense resources so we can be prepared to meet the mission requirements and challenges of the new decade.

Although it was wartime, any injuries suffered by the pilot on this particular mission would be entirely self-inflicted.

A message from the past . . .

Pressing on with a Vengeance

The regular occurrence of accidents caused by pilots pressing on in marginal weather seems as prevalent today as when I was a pilot in the Royal Australian Air Force (RAAF) from 1942 to 1946. Perhaps an account of my own lack of caution in 1944 may give you an opportunity to learn the lesson without repeating my folly—even if it has been more than 35 years since the original event.

On the morning of 11 December 1944 I flew an RAAF Vengeance dive bomber from East Sale to Tocumwal. It is about 290 km and the track lies across the rugged Southern Alps, with Mount Buller reaching up to about 5,500 feet. The weather was fine and the flight took about an hour.

At that time I had logged about 500 hours in single-engine aircraft. Over half those hours were in the Vengeance which I had been flying continuously for more than a year, including a spell in a dive bomber squadron. I mention this only to indicate that I felt quite comfortable in the aeroplane.

I took off on the return flight from Tocumwal at 1700 hours with one passenger in the rear seat, but without a route weather forecast. It had been fine all the way that morning, it was clear now at Tocumwal, so why waste time with a weather briefing when I could be on my way and get back in time to down an ale in the mess at East Sale before dinner.

I climbed to the planned cruising altitude of 8,000 feet, adjusted the engine's mixture control and settled down for a pleasant late afternoon view of the mountains.

Just past Benalla, clouds loomed ahead, so I began climbing with the aim of either flying over them or through the "canyons" between the tops. At 14,000 feet over Mansfield it was obvious that this plan would not work. The cloud tops were over 20,000 feet and the choice was to return to Tocumwal or proceed into the clouds on instruments.

I chose the latter course. Lining up my gyro compass with the magnetic compass and checking all the blind flying instruments, I entered cloud. My plan was to continue on course, let down to 10,000 feet, fly five minutes past ETA, and *then* if still in the soup, descend straight ahead over Bass Strait. It would then be a simple matter to turn and fly north to the coast, which I knew very well in that area.

Not long after going on the gages, I encountered severe turbulence and freezing conditions. This in itself was not particularly alarming, since the Vengeance was a very stable and robust machine, with wings built to withstand about 12 Gs. Perhaps in a spartan sort of way I was even enjoying the experience.

Suddenly the situation changed. The airspeed and rate-of-climb needles flickered and assumed meaningless positions, and I became decidedly uneasy. The altimeter began to unwind and the familiar hiss of air passing the canopy indicated high speed. The aircraft must be in a spiral dive, I thought, but what the hell should I do? Glancing quickly outside, I realized what had happened. The wings were covered with clear ice and the pitot head was encased in it too. I switched on the pitot heat and prayed it was not too late.

Just as suddenly as they had gone unserviceable, the instruments registered again. The pitot heat had worked mercifully fast. The airspeed was over 350 knots and the rate of descent was "off the clock." First, I thought, I must get the wings level on the artificial horizon, then pull out of the dive. When this was achieved the altimeter read well under 7,000 feet and the top of Mount Buller was hiding in the clouds somewhere nearby.

Stabilized again on course at 8,000 feet in continuing turbulence, I waited for ETA plus five minutes and began to let down. At this time I had been on instruments for about 30 minutes, and with 1,000 feet showing on the altimeter, was still in clouds and looking anxiously for the ocean. At 800 feet I broke out over the water in heavy rain, so I smartly turned to the north. After 10 minutes, when no coastline appeared, my confidence quickly evaporated. Was the compass astray? Maybe I was heading out to sea. I asked my passenger what his magnetic compass read—it was the same as mine. Okay, but what had happened to Australia?

Five minutes later we emerged from the rain into reasonably clear skies and ahead—to my great relief—lay what appeared to be Lakes Entrance. After making a positive identification, I turned west for Sale. We landed there just before last light, having taken almost two hours for the trip. The aircraft still had a coating of ice when I parked it on the tarmac. The control tower was unmanned, since flying at the base had terminated by mid-afternoon.

It was a very chastened young man who sat in his room that night and pondered the extent of his folly. Firstly, I did not check on the weather. Then, I pressed on because it was more desirable to spend the night at home base than to endure the minor hassles of bunking down elsewhere. And finally, I failed to switch on the pitot heat in icing conditions.

Pressing on, however, was the *major* sin because, as it turned out, we had flown blind through a line of thunderstorms with all their related hazards. Luckily, the Vultee Aircraft Corporation had built a stout aeroplane which survived the tremendous buffeting of several cumulonimbus clouds.

One small afterthought. Despite my blunder, I was able to recover from the spiral dive because of regular sessions on the ground in the Link Trainer. If you must fly in IMC, it pays to keep in practice. But if you want to be an old pilot, it is far safer to treat the weather with the respect it deserves.

—Adapted from the Australian *Aviation Safety Digest*

A Change of Seasons

by Major Alan D. York
Associate Editor

In the spring, young aviators who would like to become old aviators should turn their attention to . . .

Tornadoes, lightning, hail, low-level wind shear, torrential rain, and severe turbulence. All of these, however, are the nefarious offspring of just one natural phenomenon, the thunderstorm. Also known to aviators and other weather watchers as CBs (Cumulonimbus), these titans of the troposphere can occur either singly or in bunches. Some try to hide their presence by embedding themselves in stratus clouds, while others stand alone in ominous grandeur like some giant, malicious ogre, ready to snatch up an unsuspecting aviator. CBs also occasionally gather abreast of rapidly moving weather fronts and form a squall line of solid, unmitigated danger hundreds of miles long and topping out at 50,000 feet or higher. The sheer energy expended by a typical spring or summer CB is astonishing, and thunderstorms associated with weather systems tend to be larger and more intense than air-mass buildups. They are more likely to produce hail and tornadoes, too.

Thunderbumpers and their related hazards have accounted for a sizable portion of the damage done to airplanes and their crews and passengers over the years. They haven't discriminated between military and civil aircraft either, because both have incurred the wrath of these convulsive cumuli in equal measure. The following accounts and descriptions of their dangers are presented in the belief that no one *really* wants to find themselves sharing the same airspace with a thunderstorm—especially if they know what can be in store.

Hail

Last summer the crew of a jumbo passenger jet attempted to punch through a "soft spot" in a line of CBs. It was still daylight and the captain saw a ten-mile hole in the line of buildups on his radar. After penetrating the "clear area" the flight suddenly went IMC in golf-ball-sized hail. Every window on the flight deck was cracked and the radome was shattered so badly that the radar antenna became jammed with fiberglass debris. After passing through the squall line, the crew noticed that all leading edge surfaces looked like they had been hit repeatedly with a ball peen hammer. All this damage happened without any reported

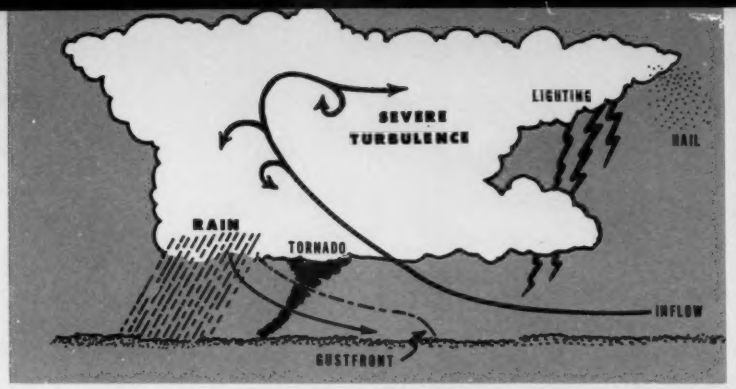
turbulence. Encounters with hail stones have been reported as far as 14 nautical miles from the storms that spawned them—reason enough to give all CBs a *wide* berth.

Tornadoes

You don't even have to be airborne to get zapped by a passing CB. Two Air Guard C-130s made unscheduled flights last year when a tornado suddenly dropped out of the bottom of a thunderstorm and swept down the flight line at Cheyenne Municipal Airport. A witness in the control tower said the twister snapped the tiedowns on one Hercules, picked it up and slammed it into an adjacent hanger. Two maintenance workers were inside the aircraft at the time but miraculously emerged unharmed. The roaring funnel then proceeded down the ramp, parted the moorings of a second C-130, lifted it about 200 feet in the air, then dropped it back onto the concrete. The impact collapsed the landing gear and severely damaged the fuselage. Fortunately there was no one aboard that airplane.

Rain

Rainfall is perhaps the least feared of the thunderstorm's hazards, and yet it has contributed to a tragic outcome in a number of mishaps. The double-engine flameout and subsequent crash of a commercial DC-9 with 85 passengers and crewmembers aboard near New Hope, Georgia in the spring of 1977 is a prime example (see July 78 *TMF*, "Mishap with a Moral"). Ingestion of extremely heavy rain mixed with hail interrupted the air flow to the engines and damaged the compressors to such an extent that all attempts to restart were unsuccessful.



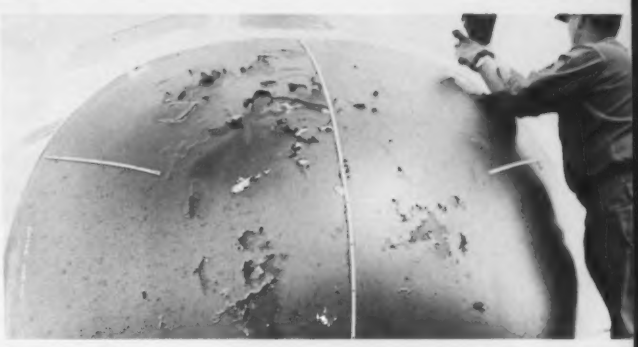
Lightning

In 1979 there were 54 reported lightning strikes to USAF aircraft. Although damage was usually limited to pitting the aircraft skin and damaging radomes or electrical systems, they could just as easily have caused fuel vapors to explode if the lightning had hit in the vicinity of the fuel tanks and burned through.

Last year's tragic loss of a C-130 due to lightning exploding a wing fuel tank revealed how potentially dangerous any lightning strike can be (see April 79 *TMF*, p. 21). This mishap, like the majority of other lightning strikes had the following things in common: The flight was operating in clouds, in precipitation, near the freezing level (plus or minus eight-degrees Celcius) and experiencing some turbulence. Knowing these common factors allows us to reduce the odds of having a strike by avoiding those conditions whenever possible. A check of the outside air temperature and judicious changes in altitude, especially during holding, arrivals and departures, could make the difference between an uneventful flight and a catastrophic mishap.

Low-Level Wind Shear

Thunderstorms are masters at producing strong, localized gusty winds that change their direction instantaneously and radically. Complete reversals of wind direction are not unusual as the gust front passes. When arriving or departing an airfield with cumulonimbus formations in the vicinity, expect wind shear and you probably won't be



disappointed (see Nov 79 *TMF*, p. 6).

Severe Turbulence

Now we come to the last hazard and perhaps the first one to grab the attention of those early aviators who naively flew their craft into billowing clouds.

Survivors of these encounters emerged with a respect for thunderstorms that usually lasted them the rest of their flying careers. Experiences like these constitute what psychologists might call "significant emotional events." They have the power to cause a person to change behavior to avoid repetition of the painful occurrence in the future. Hopefully, the rest of us can rely on second-hand experiences to convince us of the wisdom of avoidance.

Ernest K. Gann, author of *The High and the Mighty*, and *Fate is the Hunter*, recalls his first experience in a thunderstorm with such a graphic portrayal that just reading it becomes a fairly strong emotinal event in itself—especially, I think, to crewmembers who can easily imagine themselves inside the cockpit with Gann and his crew. Flying as a young copilot, he finds himself under the command of an old line pilot who elects to try and penetrate a thunderstorm system at night. Entering the clouds, they are tossed about violently, totally at the mercy of an "enraged genie" who suddenly turns their small world into a nightmare of thundering deluges of water and seemingly solid obstructions that pummel their plane unmercifully; and then just as suddenly, decides to permit them to escape its clutches and survive their sobering ordeal.

The relief felt by the reader when Gann and company emerge unscathed from the awesome storm is palpable. There is something abhorent to flyers about relinquishing control of their airplane to capricious outside forces that is easy to identify with, even vicariously. One thing is certain, a vicarious encounter—through reading the accounts of someone like Gann, or the types of articles and stories on the same subject which have appeared often in the pages of *The MAC Flyer*—is the *best* way to experience a thunderstorm. So, every spring, we find ourselves encouraging people to cast off the icy mantle of winter weather's threats and rekindle a healthy respect for one of nature's most maleficent menaces to flying safety, the thunderstorm.

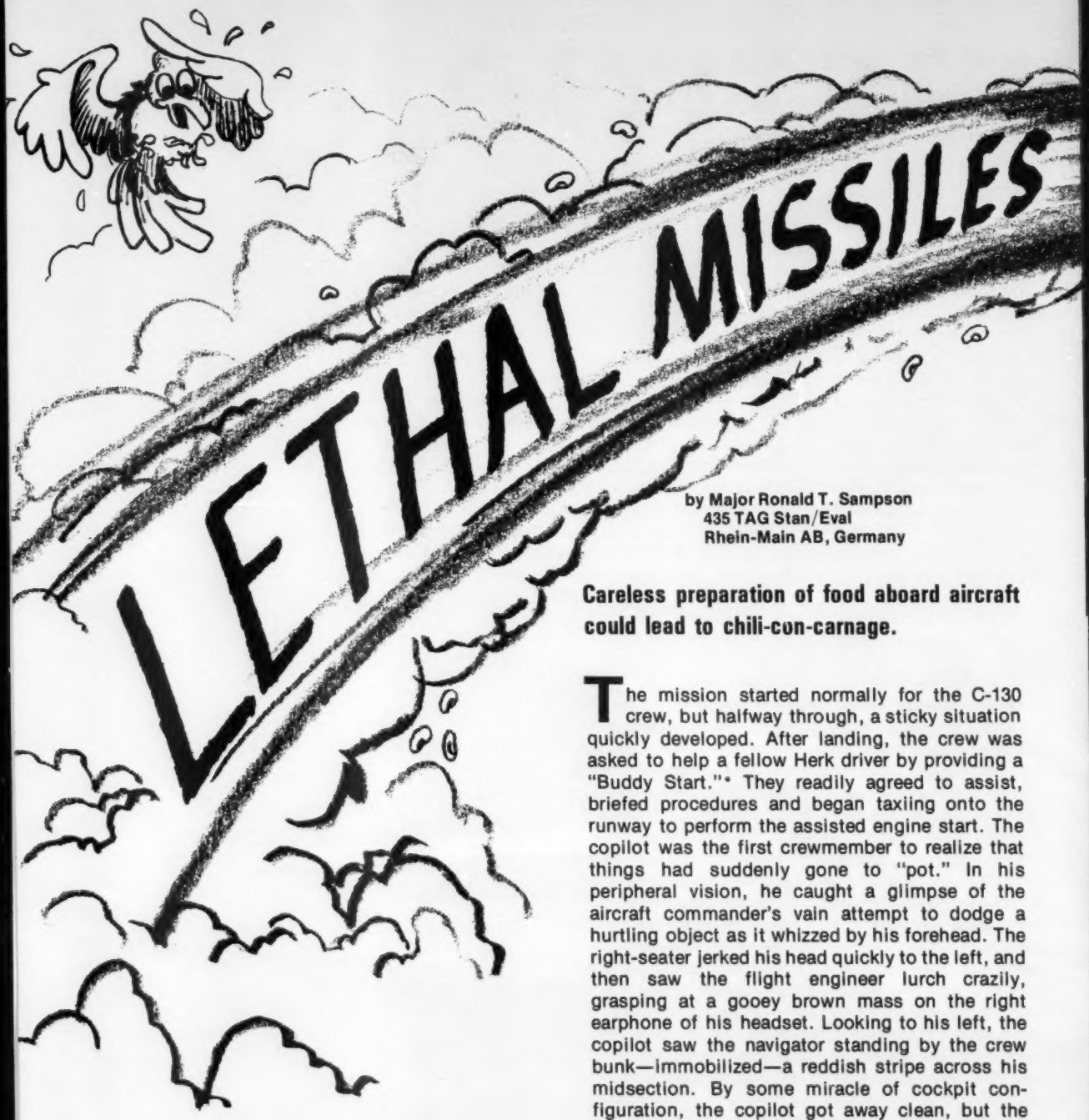
THE CO

An-72 *Coaler*

Considering the marked similarity between several other Russian airlift airplanes and their MAC counterparts, it's not too surprising to find that Ivan's experimental prototype for an advanced STOL transport bears a strong resemblance to Boeing's YC-14. Aside from being somewhat smaller than its American cousin, the Coaler has the same strange appearance created by combining overwing turbofan engines, a stubby, C-130-like fuselage, a AN-72's designer, Ole the engines atop the tended to prevent for plane operates from u helps generate lift operating noise level intended for use on ro has two independent side which are equip and retract into faire dual nosewheels ret vehicles can be load clamshell doors and the troop compartme passengers in foldin poses, 24 patients on be accommodated.

MPETITION

and a T-tail. According to the Oleg K. Antonov, placement of he high wing is primarily in- oreign object damage when the unimproved fields, but it also t and decreases the ground vel. The main landing gear is rough, unimproved runways. It ent one-wheel bogies on each ipped with high flotation tires red pods on the fuselage. The etract to the rear. Cargo and aded aboard through the two d up a self-contained ramp. In ment, the AN-72 can carry 32 ding seats. For medevac pur- on litters and an attendant may . The cockpit is roomy and designed for a crew of three. It features an extensive system of more than 50 caution and warning lights in addition to the usual array of instrumentation, weather radar, and a Doppler navigation system with a cursor driven in two dimensions over a ground map display. Vital statistics, which approximate the dimensions of a C-7 Caribou, include: length—87.2 feet, height—27 feet, wingspan—84.7 feet; cargo compartment is 29.5 feet long, and both its height and width are approximately seven feet. Comrade Antonov has admitted having some difficulty selling the Russian bureaucracy on the need for a big purchase of AN-72s, which he sees as the eventual replacement for a current workhorse, the AN-24 twin-engine turboprop.



by Major Ronald T. Sampson
435 TAG Stan/Eval
Rhein-Main AB, Germany

Careless preparation of food aboard aircraft could lead to chili-con-carnage.

The mission started normally for the C-130 crew, but halfway through, a sticky situation quickly developed. After landing, the crew was asked to help a fellow Herk driver by providing a "Buddy Start."* They readily agreed to assist, briefed procedures and began taxiing onto the runway to perform the assisted engine start. The copilot was the first crewmember to realize that things had suddenly gone to "pot." In his peripheral vision, he caught a glimpse of the aircraft commander's vain attempt to dodge a hurtling object as it whizzed by his forehead. The right-seater jerked his head quickly to the left, and then saw the flight engineer lurch crazily, grasping at a gooey brown mass on the right earphone of his headset. Looking to his left, the copilot saw the navigator standing by the crew bunk—immobilized—a reddish stripe across his midsection. By some miracle of cockpit configuration, the copilot got away clean, but the lightning-fast chain of events left him momentarily in a state of shock.

What disaster had struck the crew? Is this a war story about a sapper attack against a brave tac-

tical airlift crew? Had a terrorist group successfully hijacked a MAC aircraft? The answer is a resounding "no!" The culprit that started this chain of events was a crewmember now standing by the galley.

You see, it was well into the crew's duty day and one of the flyers felt a pang of hunger. Possessing the typical Herk crewmember's culinary acumen, he placed a single-serving can of the finest chili the commissary had to offer into the galley oven and began heating it. Just as the aircraft was taxiing onto the runway, the "terminal hungries" struck. Using twice-folded flight gloves he gingerly removed the hot can from the oven. Placing it on the nav table, he grasped the pull tab of the zip-top can and cracked the seal ever so slightly. Surprise! The can, propelled by hot, high-pressure gas, escaped his grasp and spun crazily, spewing its contents over everyone in the cockpit except the copilot. Luckily, the incident caused no real casualties.

Although this event has an element of slapstick comedy, it's not a completely isolated incident and the potential for serious injury is certainly there. The crewmember opening the can could have been scalded. The simmering contents or the can itself could have struck a crewmember in the eyes. Or, the zip-top lid with its sharp edge could have been propelled by the escaping gas and caused serious injury. During a critical phase of flight or ground operations, the distraction generated by an exploding can could conceivably cause the crew to lose control of an aircraft.

A brief thought about Boyle's Law might prevent another incident of this type. First, when a gas is heated, it expands. Second, when a gas attempts to expand in a confined area it gains energy in the form of pressure. Third, most all food containers have at least some trapped gases in with the gastronomical goodies.

There are lessons in this incident for all of us who have the necessity and privilege of eating while in flight:

1. Aircrew members should eat during non-critical phases of flight.
2. If food is to be heated in its original can it should be opened (vented) first.
3. Meals should be prepared in the galley area and not at duty stations.
4. Food provided by the inflight kitchen offers a wholesome repast, and if prepared according to directions it's designed not to explode.

**For non-Herk flyers, a Buddy Start can be used to get an engine going if its starter is broken. Two C-130's are taxied to a FOD-free area and positioned in tandem. The front Herk pilot pushes the power up enough so that the prop blast starts the propeller turning on the back C-130's dead engine. —Ed.*

U. S. Naval Safety Center recently announced that this decal is available for use in all Navy aircraft equipped with ovens. This is the result of an incident in which an unopened can of food exploded inside an oven, destroying the appliance.

"This article is super. It should be 'required reading' for all MAC crewmembers."
—Brig Gen James L. Gardner, Jr. MAC / IG

Managing Emergencies

by Gerald M. Bruggink
Bureau of Accident Investigation
National Transportation Safety Board

The rare occurrence of serious emergencies in jet transport operations coupled with the sheer number of technological irregularities covered in the emergency sections of the handbooks often give pilots a false sense of security about preparedness. Many fail to realize that some emergencies don't follow the printed scenario, that they may not have time to consult a book or checklist. Moreover, the way the decision-making process is affected by a true emergency cannot be simulated. There is simply no way to predict how the sudden demands of a life-size emergency may cripple the certificated and renowned ability of the cockpit team to master adversity.

Over the years we have seen some spectacular "saves" by flight crews who managed to bring a disabled aircraft into an airport for a successful emergency landing. It is not customary to question the decisions of a crew who "made it," even in cases where there were avoidable delays in landing an aircraft whose airworthiness could not be guaranteed by anybody. As a result, the thinness of the string that may have held things together until a safe landing could be made is seldom openly discussed.

To the extent that an excuse is needed to rattle our self-confidence, a review of some of the uncomfortable knowledge stored in aviation's closet should suffice. Actually, this article intends only to stimulate the development of protective instincts in those who recognize the brittle elements in our aviation system.

Decision-making

Decision-making implies having a choice. The manner in which we perceive a choice, or an option, is governed by the quality of the information at our disposal and the quality of its interpretation. Most textbooks on human behavior give the impression that this is a rather orderly process of weighing the pros and cons of available options and then deciding on the action that best suits our purposes.

The problem with some emergencies is that they do not allow the luxury of a by-the-book decision-making process. The available information may be incomplete or misleading. The phase of operation where the unusual occurs may leave only enough time for an immediate reaction, a response that is governed more by what might be called a sixth sense developed through training and experience than by the process of reasoning.

The interesting part of emergencies requiring an immediate and irreversible decision is that they are often handled better than those that leave time for apprehension and changes in plans. The go/no-go decision during the takeoff roll is a case in point. Most of the data are cranked into the decision well before takeoff. This takes into account such items as runway length, condition of runway and overrun, nature of terrain or obstacles beyond airport boundary, the aircraft's stopping capability and visibility conditions. The principal variables are the nature of the emergency and the crew's instantaneous evaluation of its seriousness. Considering the criticality of the time element and the problems in assessing some emergencies, the immediate no-go decision of a crew that senses reasonable doubt about the aircraft's ability to become—and remain—airborne has to be accepted and

respected, regardless of the outcome.

A conservative approach in making the earliest possible decision to keep an aircraft on the ground in questionable circumstances seems sound policy. In March 1968, a B-727 was totally destroyed when the crew continued a night takeoff roll despite a takeoff warning horn that started to sound a few seconds after the thrust levers were advanced. The crew assumed they would be able to identify and correct the condition that caused the warning signal. The aircraft was rotated on speed and lifted off. Immediately thereafter the stick-shaker activated. Concern about the ability to keep the airplane in the air and to clear a nearby freeway prompted the captain to put the aircraft back on the ground. The undiscovered, unsafe condition that triggered the warning horn was a two-degree flap setting.

In October 1977, the crew of a stretched DC-8 successfully discontinued the takeoff just before lift-off when they heard a loud noise and the aircraft started to list. A disintegrating wheel rim had cut a large hole in an integral fuel tank and the spilling fuel ignited immediately. An alert fire department managed to control the blaze but not before it had caused substantial damage.

Assuming that a slight change in the timing of the critical events had allowed the aircraft to become airborne with a fire in the wheelwell and wing root, some interesting questions can be raised:

*What immediate indications would the crew have had about the true nature of the problem?

*How could they have assessed the urgency of the situation based on information available in the cockpit?

*Could the disabling of alarm systems by fire or other events have given them a false sense of security?

*To what extent is the cabin crew trained and positioned to observe and report unusual occurrences involving aircraft structures or systems that are beyond the view of the flight deck crew?

*How long would it have taken the wing to fold after being weakened by the fire, or, how long before an explosion in the wing would have ended the flight?

These questions deal only with the technical aspects of the information a crew needs to make intelligent decisions. Other aspects of our information-processing capability in an emergency situation are often so complex that their influence can only be estimated. Consider, for example:

*The manner in which we sort out and "prioritize" multiple stimuli in a stress environment.

*The manner in which training and experience condition our perception and reflexes.

*The absence of a familiar feedback loop so that we can no longer judge the effectiveness of our actions. If present, the feedback may also be misleading.

*The manner in which unseen psychological and physiological stresses—including fatigue—may downgrade cockpit discipline and the performance capabilities of individual crewmembers.

Crew Confusion

A B-707 accident, which occurred several years ago, illustrates how easily the routine response to a "standard" emergency can be disrupted by poor crew coordination. Less than a minute after takeoff, a disintegrating compressor disc in the number-two engine severed the main fuel line to that engine. The crew felt and heard a combined shock and bang and saw the engine instruments running down. The flight engineer moved the thrust lever back and pulled the landing-gear horn-cancel switch, while the first officer pressed the fire-bell-cancel button.

A check captain occupying the forward jumpseat reported at this time that there was a serious fire in the number two engine and suggested an immediate landing. Although the number-two-engine fire shut-off handle was illuminated, and the captain had ordered "Engine Fire Drill," the number-two shut-off handle was never pulled because of confusion about what actions had been completed and what still needed to be done. As a result, fuel under pressure kept feeding the fire at a rate of about 50 gallons per minute until after the landing. During the well-executed, expedited approach to the nearest runway the burning number-two engine fell away from the aircraft, but the fire in the remains of number two pylon forward of the wing persisted. Shortly after a suc-

It does not require an emergency of monumental proportions to reduce the margin for error to zero.

cessful landing there was an explosion in the left wing. Five occupants were unable to escape from the burning aircraft.

Another example of cockpit confusion occurred when an ingested seagull disabled the number four engine of a B-747 immediately after lift-off for a long ferry flight. The captain called gear-up but this command was not heard by the first officer who started assisting the flight engineer in securing the engine. The captain concentrated on maintaining vertical separation from buildings in the takeoff path, while climbing out. At a height of 300 feet "flaps five" was selected. At about 1,100 feet the five minute limitation on takeoff thrust was reached and thrust was reduced. At this time it became impossible to climb or accelerate any further and the captain ordered the immediate dumping of fuel. Performance gradually increased and the flaps were retracted in stages. It was not until after the situation lost its criticality that the first officer discovered that the gear was still down.

These two incidents highlight a universal shortcoming in emergency training: our inability to duplicate the unmitigated stress of a real or imagined threat to survival.

One of the best safeguards under these conditions is the captain's firm and immediate exercise of command authority and the entire crew's strict, methodical compliance with pertinent procedures. This enforced orderliness may be the most important factor in channeling the crew's adrenalin flow in the desired direction.

The Gift of Time

By their very nature, inflight emergencies tend to allow more time for analysis and corrective action. In November 1977, the crew of a B-707 experienced a nose-down runaway stabilizer trim, and other unusual indications, while at FL 390. At the same time, one of the cabin crew reported flooding of the forward toilet. (The washbasin had overflowed due to a defective faucet.) Water had entered the electrical bay and affected electrical equipment. The runaway stabilizer drill was completed and the flight continued manually. In this case, a readily discernible cause-effect relationship, combined with the moderate rate of the trim deviation and the high altitude, created no serious problems.

Incidents involving smoke or fire should be treated as critical from the very beginning. When the origin of smoke or fire is unknown, and when checklist actions fail to identify and correct the problem, land as soon as possible or bring the aircraft down to a level from which an immediate emergency landing or ditching can be made.

"The Pilot's Bag of Tricks"

Misinterpretation of unusual instrument indications can quickly lead to a critical situation. In December 1974, the crew of a jet transport was unable to regain control of the aircraft after stalling it at about 24,000 feet while attempting to reduce an abnormally high airspeed and rate of climb. The crew attributed the high readings to the aircraft's light weight and weather conditions. Actually, while the flight was climbing through forecast icing conditions the pitot heads became blocked because the crew had neglected to turn on the pitot heater switches.

There were no indications that any of the crewmembers suspected the true nature of the problem and there was no apparent attempt to revert to attitude flying. This is a disturbing discovery since one expects that every pilot has been taught to recognize, and cope with, problems in the pitot-static system. It is one of the many pieces of knowledge that should be stored in the subconscious, ready for recall through the process of association. There is another name for this store of knowledge: "the pilot's bag of tricks." There is no standard inventory of what should go into this bag. The size and quality of its contents are probably governed as much by what we learn from our own experiences, and those of others, as by formal training.

The Narrow Margin

It does not require an emergency of monumental proportions to reduce the margin between success and failure to zero. In January 1969, a DC-8 was flown into the water during an instrument approach while the captain and the flight engineer were ascertaining the position of the landing gear following the failure of the gear indicator lights.

It appears that when we

In addition to using simulators to prepare pilots to jump through the customary hoops, we should encourage programming real-world ordeals into their training.

clutter cockpits and traffic control rooms with warning devices we run the risk of dulling the sensitivity of our internal warning systems to the point where we become victims of our own cleverness.

In some modes of transportation serious thought is given to using technology in such a manner as to prevent even the most irresponsible people from hurting themselves. Aside from the question of whether any society can afford the price of a foolproof transportation system, the nature of aviation is such that it will probably be the last to fall victim to the utopian idea that you can design individual responsibility completely out of our freedom of mobility. Therefore, true safety in aviation continues to require an operating intelligence and conscience.

"Groundcheck Okay?"

It is not unusual for an emergency to start with our failure to listen to an aircraft which is trying to tell us it has a problem. These emergencies often start with the placebo: "Groundcheck okay," or "Carried over." In August 1977, the number-one engine of a four-engine transport went into full reverse at FL 300. Ten days before this jolting incident, the number-one engine reverse-operating-light started acting up. Maintenance personnel could not find anything wrong with it. During the takeoff on the day of the incident the reverse light illuminated again, then went out.

The lesson is obvious: If you want to protect yourself against unpleasant surprises from a system problem that stymies maintenance, insist on having it isolated. If the questionable system is essential to flight, don't accept the aircraft.

Compromises with regard to the intent of the MEL (minimum equipment list) fall in the same category. Consider the predicament of the crew that found itself without electrical power shortly after a night takeoff into instrument conditions. The trijet aircraft had previously been operated for 42 hours with the number-three generator inoperative (permissible by MEL). Shortly after liftoff, a fire warning in the number-one engine forced the crew to shut down the engine. (No evidence of an in-flight fire was found in the wreckage.) Not long after shutdown of the engine, all power from the remaining number-two generator was lost. The standby electrical system either was not activated or failed to function. The crew lost all attitude reference and an accident was unavoidable.

As a result of this accident the MEL was revised and an independent, standby attitude indicator became mandatory for all (civil) turbojet aircraft.

Booster Shots

The need to be reminded of our vulnerability to emergency situations has a parallel in our need to suffer booster shots to maintain immunity against certain diseases. Unfortunately, too often we expect to maintain mishap immunity by keeping track only of those emergencies that resulted in widely-publicized accidents. Numerous daily incidents occur that are overcome. In most cases it is the tolerance built into the system, or the competence of an alert crew, that takes the sting out of potential threats. In some cases it is the random timing of the event that makes it harmless. However, practically all cases demonstrate the fallibility of the human element throughout the aviation system.

In addition to using our life-like simulators to prepare pilots to jump the customary hoops as part of their recurring certification process, we should encourage the programming of real-world ordeals into them. A onetime, unanticipated exposure to incidents such as an iced-up pitot-static system or total loss of electrical power, would make a pilot more responsive to actual problems in these areas. This type of training promotes enlightened decision-making in unusual situations without downplaying the constraints of standard operating procedures.

By giving emergency awareness the level of attention it demands, we also encourage the worldwide sharing of experiences that should form the basis of our preparedness for uncommon challenges.

This article was adapted from a paper presented at the Flight Safety Foundation's 1978 Corporate Aviation Seminar by Mr. Gerard M. Bruggink, Deputy Director of the Bureau of Accident Investigation of the National Transportation Safety Board, and reprinted in Pan Am's Crosscheck. *—Ed.*

With the help of an old friend, C.R. unceremoniously influences international relations.

C.R. TERROR

MAC's Foremost Flyer spotted a long lost friend leaning against the counter in the weather shop talking intently to Lieutenant Misty Knight in an obvious attempt to seduce the pulchritudinous new prognosticator. "Feather! is that you?" C.R. squealed as he bounded through the door. His buddy from bygone days turned and faced him with that unmistakable grin. "You crafty old cajun, it *is* you," C. R. quickly confirmed.

"Well bust my buttons if it isn't the Terra of the Airways," C.R.'s Crescent City comrade declared in a deep Louisiana drawl. "Don't tell me you're our new active duty advisor."

"Guilty as charged," C.R. confessed. "They needed someone with a vast amount of C-130 experience, so here I am. I see Reserve duty agrees with you, Feather," the Advisor with

Avoirdupois said, pointing to the major's leaves on his friend's flight suit. "Those oughta be worth a couple Terrorific 'Tinis at happy hour this evening."

"For sure," Feather laughed. "I should be down from this local trainer just in time. After two weeks leave in Baton Rouge, I've gotta get recurrent."

"Great," the Terrorific Tippler said while glancing instinctively at the winsome weather person who had a puzzled look on her face. "What is it, m'dear?" he asked. "Does being in the presence of two living legends overwhelm you?"

"Feather?" she questioned quizzically. "But you just told me your name was Tousante L. Merchante."

"For sure," admitted Major Merchante. "Feather is just a nickname the guys at Clark gave me."

"You're far too modest," declared C.R. "You see m'little chicadee, Tousante here won that cognomen some 15 years ago by feathering more C-130 props incorrectly in one month than anyone before or since, to my knowledge. And it stuck for good the day he flubbingly feathered all four Hamiltons on short final with only one engine actually on fire."

"Did you do that?" asked Misty in wide-eyed innocence.

"Afraid it's true," admitted Merchante candidly.

"Yeah, but somehow he still made a successful landing out of it," injected C.R. "And they would have given him a medal for saving the aircraft, too, if the copilot and engineer hadn't spilled the beans. Yep," C.R. concluded, "he may be Tousante to the rest of the world, but to me he'll always be Feather Merchante, the cagiest cajun to ever stop a prop."

"You know, *mon ami,*" Merchante observed, "I haven't thought about that in years. Guess I must have been pretty flakey in those days. I've straightened out my act since then though. In fact, 2,000 more hours of safe flying and I'll have a 10,000-hour patch to replace this one," he said, pointing to the 5,000 - hour accident-free award on his chest.

"Commendable, ol' buddy. You've certainly come a long way since the Philippines," C.R. asserted. "It just goes to prove what I've said all along—experience is everything in the flying game."

"Right," agreed Major Merchante.

"But you have to admit," added C.R., "we did have ourselves some high times in those days."

"Ah yes, the tropics," reminisced Merchante. "Remember those typhoon parties?"

"'Deed I do," recalled C.R. "Hey, speaking of the tropics," the Hercules Honcho said excitedly, "I just got wind of a last-minute mission to pick up a brand new H-model tomorrow and fly it to the Republic of Chiquita on the Pacific Coast of Central America. I was just going over to volunteer in the name of international relations and goodwill when I saw you. I'm looking for a stalwart second in command; you interested, Feather? It's a guaranteed RON in Atlanta and a two-day layover in Rio Fiesta."

"Sounds like a one time good deal," Merchante speculated, barely able to contain his excitement. "Isn't Rio Fiesta supposed to be the St. Tropez of Latin America," he mused. "I think a saw, er read, a recent magazine article about that place."

"That's the place," verified C.R. "And I see we *read* the same periodicals, heh heh. What do you say, Feather? Wanna go—for old times sake?"

"Count me in," returned the hot-blooded southerner. "I'll meet you at the club later."

"Okay, I'll set us up to deadhead down to Dobbins tomorrow," C.R. pledged. "We oughta get to Rio Fiesta the following day in time to watch the sun set over the rim of one of those famous pineapple-rum punches."

"Shades of Clark," Merchante smiled as he waved goodbye.

"See you at the club for nostalgia hour. We'll go over the details and catch up on old times," MAC's Wheeler-Dealer declared.

As soon as Merchante disappeared, the Rotund One bellied up to the weather counter with the smooth rolling movement he'd perfected during countless happy hours at watering holes all over the world. "Perhaps you'd care to join us this evening, m'dear," he casually invited the eye-filling forecaster.

"I just might do that," returned Misty, with a coy smile. "It would be worth it just to learn what 'feathering a Hamilton' means. You pilots speak the strangest language."

Having safely arrived at the Goergia airplane factory the next day, the Terrorific team was met by the Air Force liaison officer, Lt Col Kinasaw. "Welcome, gentlemen," he greeted them cheerfully as they disembarked. "We sure appreciate you folks taking this mission on such short notice."

"Just doing our part to

promote harmonious Pan American relations," explained the Master Manipulator.

"Isn't it a little unusual for us to be delivering somebody else's airplane?" asked Sergeant Max Torque, the skeptical engineer. Adding under his breadth, "It probably don't even have U.S. markings."

"It is a little unusual," explained the colonel, "but the entire Chiquitan crew came down with some intestinal ailment—I believe they called it the gringo goose-step. Anyway they'll be hospitalized for at least three more days, and the delivery date is tomorrow. Their air force is planning a big reception ceremony and expects the arrival of an immaculate new C-130. That's what our superiors wanted too, so we offered to substitute a USAF crew. And here's the baby we want delivered, with your help," he concluded, pointing to a brand new Hercules parked on the ramp.

"What makes this particular C-130 so special, anyway?" wondered Blinky, the nearsighted navigator.

"Well," said the colonel, "this airplane happens to constitute the entire modern air force of Chiquita. It's the first—and last—C-130 to be delivered, so it represents their whole airlift capability. You can understand why they're anxious to have it delivered as soon as possible and in factory-fresh condition. We sent a company maintenance team and a technical representative down there two weeks ago to make all necessary arrangements. They will check it over when it arrives just to make sure everything's ship-shape."

"Have no fear," the Pompus Pilot proclaimed. "My handpicked crew and I will deliver this Herk unblemished."

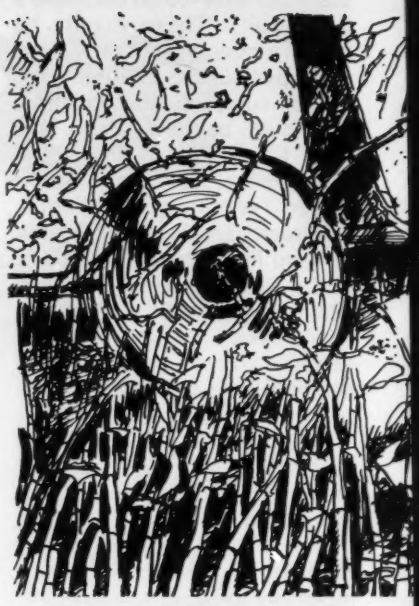
"I'm sure you will," said Colonel Kinasaw, evenly. "Now, let's go take care of the paperwork so you all can check into the motel. I'm sure you'll want to get a good night's rest before starting out on such a long flight tomorrow."

"Riiight!" C.R. and Feather said in unison, trading mischievous smiles and obviously sharing similar visions of a night on the town in "Hotlanta."

Next morning, the Terrorific Troop made short work of the preflight and filing rituals. Soon they were slipping the surly bonds, headed south to deliver Chiquitan Air Force One . . . and only. After an ops stop at Gulflin AFB for fuel, the flight went remarkably fast—at least for the two pilots, who traded war stories and shared interminable reminiscences of their escapades in the Pacific. "Just like ol' times, huh Feather?" the Master Manipulator grinned from the left seat, as they neared their destination.

"For sure," agreed his Acadian sidekick. There's the Rio Fiesta VOR comin' in now. DME's a little shaky though."

"Well, one can't expect the best of navaids in this part of the world. In fact," C.R. reasoned, "we Norte Americanos probably



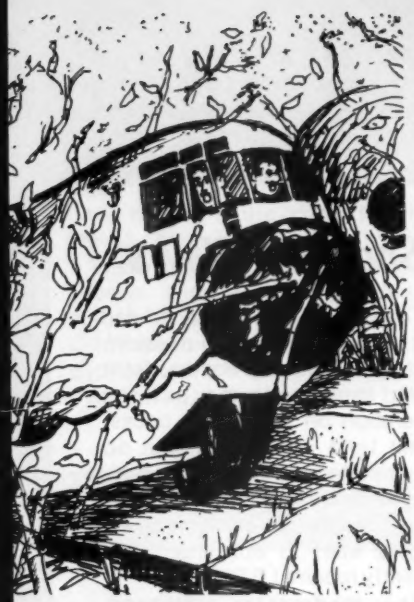
get a little spoiled with all our clean, well-lighted airports, reliable navaids and sophisticated ATC gadgetry. Down here, approaches are more visual than VOR, heh, heh."

"Pickin' up low clouds, driftin' in from the ocean," observed Feather. "Hope we can get a peek at the airport before MDA."

"Chiquitan Air Force Numero Uno, this is Fiesta approach. Descend to 2,000 feet—cleared for VOR approach, runway 35," came the well modulated voice over the radio.

"Wow, that guy talks better American than we do," admitted Merchante. "DME's still not holding. You see anything yet, C.R.?" he asked.

"No, I . . .wait," the Hawk-Eyed *hefe* interrupted himself. "I think I see a runway. Yes, that's



gotta be it Feather. Tell 'em we have the airport in sight, and we'll make a visual approach from here. I'd just as soon keep clear of these clouds in case there are some uncontrolled local bush pilots hauling bananas in their bug smashers."

C.R. caught short glimpses of the runway through occasional holes in the ragged, moisture-laden deck as they descended.

"Numero Uno," called the tower. "Cleared visual approach, runway 35. No reported traffic."

"Deftly banking the C-130 around a whispy cloud fragment and lining up with the runway, C.R. displayed momentary concern. "Not a very big airport, is it," he muttered to his copilot. "Looks kinda overgrown, too."

"Like you said," Merchante reminded, "We're spoiled with all our modern facilities in the States. Gear rechecked," he reported.

"Right you are ol' buddy," C.R. exclaimed. "Gimme full flaps."

As they approached the runway, both pilots' brows slowly twisted into furrows of puzzlement and worry. Ten feet above the pavement C.R. grunted, "Look at all that grass growing up through the asphalt. This place is really run down."

"Runway's a lot narrower than it looked at first, too," added Merchante. "That almost looks like sugarcane growing along the side of . . . oops." Feather stopped talking just in time to hear the main gear squeek on touchdown, followed immediately by the buzz saw sound of the outboard props chewing up sugarcane stalks.

"Yipes! This can't be the right place," C.R. howled as the C-130 went IFR in finely sliced silage. Both outboard turbos sucked up the debris, causing their temperature gauges to surge toward the red lines. "Feather, quick," C.R. shouted, "Feather both of them." His temporarily dazed comrade grabbed the first two condition levers he could get his hands on, the ones for numbers three and four engines, and in a wild-eyed Philippine flashback, pulled them rearward. With both right engines feathered, C.R. couldn't keep the airplane from veering off the right side of the weedy runway. As the main landing gear careened through the recently rained-on soil, mud began combining with the sticky fodder, completely covering the forward half of the airplane and giving it the appearance of some strange behemoth that had recently been tarred and feathered. Both pilots stood on the left brake pedal and C.R. reversed the left-hand props, causing the mud-encrusted C-130 to swing back onto the runway and spin around 180 degrees before coming to a stop—ten feet from the end of the abandoned airstrip. Everyone sat in stunned silence after the engines were shut down.

"Numero Uno, this is Fiesta tower. Say position. We still don't have you in sight," came the scratchy radio call.

"We can't be too far away if we're still in radio contact," C.R. said, breathlessly.

"Sir," Blinky piped up. "The DME was reading seven miles south of the *real* airport just before we touched down."

"Tell 'em where we are, Feather," the Crushed Comandante advised. "And request they send some maintenance people along to check out these engines before we fly it the rest of the way." He squinted dejectedly out the muck-covered side window and muttered. "No immaculate reception today."

Just then, the first drops of rain from a passing tropical shower began pelting the fuselage and the grunge began slowly sliding off the newly baptized Hercules.

QUICK STOPPERS

Shocking News

Three Herks were scheduled for a formation airdrop mission, but a fast-moving weather front with thunderstorms put the operation on hold. With occasional light rain falling, but no thunderstorms yet reported, maintenance asked one C-130 crew to try a self-contained engine start to ops check the recently repaired GTC.

The loadmaster stationed himself outside the aircraft and watched numbers three and four engines start normally. As number two was cranking up he noticed a tingling sensation in his ears. He saw a blue flash near the interphone cable about the time number two came on speed, and suddenly received a shock through his headset. The stunned scanner called for the engines to be shut down and reported his injury.

Investigation showed that lightning had struck near the airfield while the C-130 was starting engines. A static discharge traveled through the moist ground, and was conducted by the wet interphone cord to the loadmaster. Although he suffered a temporary partial loss of hearing (from which he completely recovered), he was the first person on the flight line to get the "shocking" news that lightning was in the area.

Gear Up, Struts Down

A phase-two loading crew readied the Starlifter's cargo as the aircrew members did their preflights before a night departure. However, the original crew was unable to fly the mission because one of them went DNIF. When the replacement aircrew arrived at ops, they were taken directly to the "cocked" C-141 that had been sealed after preflight by the first crew.

Wanting to get the mission going, the second aircrew expeditiously boarded the Starlifter, started it up, and departed post haste. While the C-141 was cruising toward its destination, a CT-39 pilot reported a Starlifter loading strut laying on the runway at their departure base. After landing, a check of the C-141 revealed that both loading struts were missing and that three of four locking pins were dangling from the bottom of the fuselage—the fourth pin was missing. The second loading strut was found near the approach end of the runway at the destination air base.

It's fairly obvious that sometime during the predeparture phase of the mission someone didn't do his or her job right, and left the loading struts extended. It's equally obvious that the second aircrew could have detected the oversight. Even a "count the tires and engines" style walk-around should have revealed the extended struts.

A Familiar Ding

The following analysis and mishap story is adapted from the year-end report of a sister service. Its moral is quite clear and applicable to MAC operations.

Analysis revealed that those involved in mishaps were not the young, inexperienced aviators fresh out of flight school. Quite the contrary, they were high-time aviators with an average flight time of 4,300 hours and a median age of 34. Perhaps more alarming is the fact that there was an IP on board and *at fault* in half of the mishaps.

For instance, when the IP simulated a number-two engine failure on downwind leg of a traffic pattern, the student pilot responded with proper procedures. The instructor then adjusted the number-two throttle to maintain zero thrust. On short final the IP retarded the right throttle to idle, and just before touchdown, the student reduced power on number-one engine. The aircraft "fell through," hit the runway and bounced 15 to 20 feet into the air. The IP *assumed* the student would add enough power to cushion the aircraft onto the runway, but instead the student decided it was time to go around and rapidly advanced both throttles.

Because it had been operating at low rpm for some time, the right engine didn't accelerate as fast as the left and the aircraft yawed to the right, placing it on a collision course with a windsock pole. Rather than risk the collision, the IP decided to land in the sod area beside the runway. The left wing hit the ground and the airplane slid sideways, collapsing the right-main and nose gears.

The instructor had violated flight training procedures, failed to recognize a dangerous situation, and failed to anticipate the student's actions. The IP was programmed for landing, while the student was programmed to go around.

—Adapted from *Flightfax*

Raindrops Keep Falling

Raindrops on your windshield and on the terrain can cause visual distortions which may lead you to miscalculate approaches. Several kinds of distortion errors are possible, including those due to the refraction and diffusion of light.

When light passes from one medium to another—air to water—it appears to be "bent." Actually the water "slows" the light rays and causes refraction. A familiar effect of refraction occurs when objects on the bottom of a clear pool of water look much closer than they are causing the pool to appear deceptively shallow.

In heavy rain, even though prevailing visibility is fairly good, terrain contours or lights may seem lower than their actual elevation relative to aircraft altitude. Diffusion of light causes this by dimming the rays reaching your eyes. Objects thus appear farther away. Under different circumstances, diffusion may cause approach lights to appear larger, and therefore closer, than they really are.

The NTSB has cited such visual distortions during transition from instrument to outside references made at night or during rainfall as factors contributing to several recent air crashes. During this kind of transition, the pilot mistakenly judges that he is too high and sets up a greater-than-normal sink rate on short final, often leading to an unmanageable arrival over, or short of, the threshold. Visual illusions due to refraction and diffusion vary greatly by aircraft type, airfield facilities, and weather phenomena, so there's no general rule of thumb to deal with them. However, awareness of the possibility of rain distortion should be enough to alert the crew and have one pilot stay on the gauges until touchdown.

Bumped Pax

The Boeing 747 captain reported a line of cumulonimbus clouds stretching across his climb path, but ATC advised him that several aircraft had penetrated the line with few problems along his proposed route of flight. Approaching 20,000 feet, the big Boeing's crew spotted an opening between two storm cells and switched on the fasten seat belt sign.

Shooting the gap, the jumbo jet was rocked by two five-second encounters with severe turbulence. After passing the storms the cabin crew reported that one lady passenger complained of back pain and a child had suffered a bruised head. After landing, a check of the flight data recorder showed that the 747 had encountered +2.25 to -0.52 Gs in the turbulence.

—Adapted from British Airways' *Air Safety Review*

AFTER DEADLINES

POWER CARTS CAN CHARGE A STARLIFTER AIRFRAME WITH 115 volts if improperly connected. In a recent incident, the shield around a C-141's six-pin power receptacle was missing, allowing a technician to plug in the external power cord offset one pin to the left. Consequently, AC power was fed to the airframe. The error wasn't noticed until the aircraft ground wires started burning!

AFISC's 1980 MISHAP FORECAST FOR MAC is nine DOD Class A and eleven Class B mishaps resulting in six aircraft destroyed. Here's the breakdown by aircraft type:

	C-5	CT-39	C-130	C-141	H-1	H-3	H-53
Class A	1	1	1	3	1	1	1
Class B	5	1	2	3	0	0	0

We undercut the Safety Center's best guess in 1979; no reason why we can't do it again in 1980.

A "WEENIE WAGON" REUNION will be held in Dover, Delaware, on 24 May 1980. Former C-133 crewmembers who want to attend should contact Jay Schmukler, 153 South Bradford St, Dover, DE 19901; phone 301-734-8101.

SOLAR FLARE ACTIVITY HEATS UP IN 1980 and may effect navigation and communication radios. To help crewmembers cope with this natural phenomenon, AAVS recently released a new slide-tape training program, "Solar Activity and Its Effects on Communication and Navigation Systems" (STT-Q0-0224). The program is available from Base Weather Stations and ANG Weather Flights.

OPPORTUNITY KNOCKS

WANTED—A MAC pilot or navigator, rank of captain, with creativity, imagination and the ability to write well. Experience with and knowledge of airlift operations a must. The job is Associate Editor of *The MAC Flyer*, and it offers some of the most unique challenges and opportunities in the Air Force. Time frame for PCS is summer 1980, so act soon. For complete info, contact Major Gibson on Autovon at 638-3534, or write to HQ MAC/IGFE, Scott AFB, IL 62225.

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Something about that buildup bothers me more than it's size, Cranston!